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Application No.: 10/032,349
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REMARKS

Claims 1-30 remain pending.

In the Office Action, the Examiner rejected claims 1-30 under 35 U.S.C. § 103(a) as being unpatentable over Liu et al. ("New Fast Algorithms for the Estimation of Block Motion Vectors," IEEE Int'l Symp. on Circuits & Systems, pp. 148-157, April 1993) in view of Pullen et al. (U.S. Patent No. 5,923,376).

Applicant respectfully traverses the § 103(a) rejection of claims 1-30 over Liu et al. in view of Pullen et al.

A *prima facie* case of obviousness has not been established, because no reasonable combination of Liu et al. and Pullen et al. teaches or suggests all claim limitations. Independent claims 1, 16, 19, and 25 require a method, encoder, medium, and system including, *inter alia*, "determining a set of K candidate blocks $B_1..B_K$, with each block B_i, for i=1 to K, identified by a pixel in search set S_i and minimizing a first distortion function relative to the target block; and determining which [one] of the K candidate blocks $B_1..B_K$ minimizes a second distortion function relative to the target block."

Similarly, independent claim 10 requires a method including, *inter alia*, "determining a first distortion measure based at least on pixels of the target block and the first minimum block that are outside the first row or column of the target block and the first minimum block; determining a second distortion measure based at least on pixels of the target block and the second minimum block that are outside the second row or column of the target block."

Independent claim 27 requires an encoder including, *inter alia*, "a first minimization module that determines a set of K candidate blocks $B_1..B_K$, with each block B_i, for i=1 to K, minimizing a

respective first distortion function relative to the target block, the respective distortion function

based only on a set of two or more collinear pixels from the i-th row or column of the target

block and a set of two or more collinear pixels from the i-th row or column of block B_i; and a

second minimization module that determines which of the K candidate blocks $B_1..B_K$ minimizes

a second distortion function based at least on pixels outside the i-th row or column of the target

block." Independent claim 29 requires a method including, *inter alia*, "identifying a set of two

or more candidate blocks in the reference frame, with each candidate block minimizing a first

distortion function based on only one respective line of pixels of the target block and a

corresponding line of pixels in the candidate block, the one respective line being different for

each candidate block; and determining which one or more of the candidate blocks minimizes a

second distortion function based on pixels from more than two lines of the target block." The

combination of Liu et al. and Pullen et al. fails to teach or suggest all limitations of the claimed

method, encoder, medium, and system set forth in claims 1, 10, 16, 19, 25, 27, and 29.

Page 3 of the Office Action alleges that the claimed second distortion function is taught

or suggested by "least cost" within Figs 5-7, 9-11, 13, 20, and 21 of Pullen et al. Pullen et al.,

however, fails to even disclose or suggest a second distortion function, much less one as

specifically set forth in the claims.

Col. 14, lines 16-23, which describe Fig. 7 of Pullen et al., provide (with emphasis

added):

> Otherwise, a checkerboard search is performed (block 144) and **the smallest distortion measure and corresponding codeword cost for the best correspondence** is computed (block 146). The cost of the best correspondence found in the checkerboard search is

compared to the cost for the best correspondence found between the no-motion and local
search and the best correspondence having the least cost is selected (block 148).

This portion of Pullen et al. teaches determining only one "smallest distortion measure" and a

corresponding "codeword cost" for this single distortion measure. It is plain legal error for the

Examiner to imply that the claimed "second distortion function" reads on the disclosed codeword

cost. One of ordinary skill in the art would not interpret "second distortion function" as equaling

a codeword cost, because the plain meanings of the two terms differ. As evidence of this, Pullen

et al. uses the term "distortion measure" when referring to a something related to distortion, and

the term "codeword cost" when referring to something other than distortion. If Pullen et al.

actually taught or suggested a second distortion function as claimed, it would presumably use the

term "distortion," which it has shown it knows how to do. Pullen et al., however, does not.

Thus, it is improper and contrary to the understanding of one of ordinary skill in the art to

read the claimed second distortion function on the "codeword cost" disclosed by Pullen et al.

Pullen et al. neither teaches nor suggests the claimed second distortion function.

As is clear from the above-quoted section from Pullen et al., what the reference does

teach is comparing a cost that *corresponds* to one distortion measure with two other costs to

choose among 1) a checkerboard search, 2) no-motion, and 3) a local search. The

characterization as this three-way cost comparison as a "well known additional distortion

minimization technique" on the last line of page 3 of the Office Action, in addition to being

incorrect, is an over-simplification and an over-generalization. In other words, given Pullen et

al.'s teaching of comparing three costs to determine which type of search to perform, there is no

way that one of ordinary skill in the art would decide to modify Liu et al. to obtain, for example,

a "second minimization module that determines which of the K candidate blocks $B_1..B_K$ minimizes a second distortion function based at least on pixels outside the i-th row or column of the target block," as set forth in claim 27.

If the Examiner disagrees, he is respectfully requested to provide specific portions of Pullen et al. that would motivate one of ordinary skill in the art to add minimizing a second distortion function *in as much specific detail as claimed* to the different encoding algorithm in Liu et al., and to explain why, faced with the teachings of both references, one of ordinary skill would have felt compelled to make such a specific addition to Liu et al. Otherwise, the Examiner is respectfully requested to concede that no reasonable combination of Liu et al. and Pullen et al. teaches or suggests *all limitations* of independent claims 1, 10, 16, 19, 25, 27, and 29. Because no reasonable combination of Liu et al. and Pullen et al. teaches or suggests all such claim limitations, a *prima facie* case of obviousness has not been established for claims 1-30.

A *prima facie* case of obviousness has not been established for claims 1-30, because one of ordinary skill in the art would not have been motivated to make the proposed combination. Other than the conclusory "best block correspondence at the lowest cost" justification, no reasoned explanation has been provided as to why one of ordinary skill would have added minimizing a second distortion function to Liu et al., particularly in view of the reference's implicit teaching that the one distortion function that it discloses is sufficient. The proposed "best block correspondence" provides no motivation on its own to make any particular modification to any encoding reference, because good block correspondence is the underlying goal of all motion vector-based encoding schemes.

Rather, Applicant respectfully submits that the addition of <u>Pullen et al.</u> is motivated

solely by an administrative desire to reject claims, rather than any reasoned behavior of one of

ordinary skill in the art. In the absence of the specific reasons, requested above, why one of

ordinary skill in the art would have wanted to modify <u>Liu et al.</u> to obtain the invention *as*

claimed, the § 103(a) rejection of claims 1-30 is improper and should be withdrawn.

Reconsideration and allowance of claims 1-30 are respectfully requested.

In the event that any outstanding matters remain in this application, Applicant requests

that the Examiner contact Alan Pedersen-Giles, attorney for Applicant, at the number below to

discuss such matters.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is

hereby made. Please charge any shortage in fees due in connection with the filing of this paper,

including extension of time fees, to Deposit Account No. 50-0221 and please credit any excess

fees to such deposit account.

Respectfully submitted,

Dated: <u>October 11, 2006</u>

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